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Can the CDC's Get Smart program and a Decision Tree alter Clinician Guideline Adherence for ABRS and AVRS?

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Can the CDC's Get Smart program and the Use of a Decision Tree Model alter Clinician Guideline Adherence for ABRS and AVRS?

Background

Each day, clinicians work with patients to provide the necessary care to improve individuals' health conditions. Clinicians use vast amounts of information to formulate decisions to treat patients. However, clinical practice guidelines are developed to help clinicians systematically treat a particular disease process, especially in the use of appropriately prescribing antibiotic therapies. Clinical practice guidelines are in place to help clinicians provide a standardized process of care based on current research that leads to positive patient outcomes.

According to Darrat, Yaremchuk, Payne, & Nelson (2014), utilization of clinical practice guidelines are intended to improve quality of care and decrease ineffective therapeutic practices. Such practices include decreased antibiotic use, decreased healthcare-associated infections, decreased length of stays, and a decrease in a prevalence of antibiotic bacterial resistance (Laximinarayan et al., 2013). Friedman et al., (2008) reported that consensus from clinicians combined with changes in behaviors and attitudes are necessities for successful implementation of clinical practice guidelines. Another benefit of appropriate application of clinical guidelines is that patients who receive the appropriate therapeutic treatments experience fewer side effects and increased patient satisfaction.

As an important piece of guideline adherence, providers should advise patients to use supportive treatments such as antihistamines, decongestants, corticosteroid nasal sprays, and nasal washings; as adjunctive treatments for ABRS and AVRS. Treatment guidelines that advocate prevention of antibiotic over-prescribing will also promote "watchful waiting" and supportive therapies with careful follow-up as regimens for patients with viral infections (Rosenfeld et al., 2015).

Particular treatment guidelines factor in timing of symptoms as a way to assist providers to diagnose ABRS and AVRS. For example, if a patient presents with a set of symptoms that have been ongoing for ‘x’ number of days, then the provider can apply the treatment guideline to the patient’s symptoms and timing of the symptoms to provide an appropriate diagnosis and treatment plan. In diagnosing a viral sinus infection, the literature used the term acute viral rhinosinusitis (AVRS) to include upper respiratory infection (URI), viral syndrome, and viral infection/common cold. For a bacterial infection, the literature used the term acute bacterial rhinosinusitis (ABRS) which is associated with sinusitis and the specific sinus sites (maxillary, frontal, ethmoid, and sphenoid).

Chow et al. (2012) developed a decision tree tool that examined acute bacterial rhinosinusitis (ABRS) symptoms with a timing component (symptoms for 3-4 days, 5-10 days, and >10 days). If symptomatic for 3-4 days, the patient’s symptoms had to include a fever > 102F and purulent nasal drainage before diagnosis as ABRS was warranted. For a patient with symptoms for 5-10 days, her symptoms might be classified as “worsening” and the provider would have to ask: “Did your symptoms improve and then get worse?” This ‘worsening’ state is typically known as “double sickening.” If the patient stated ‘yes’ to the critical question, then the patient would be diagnosed with ABRS correctly. Lastly, if symptomatic for greater than 10 days, then the condition is known as “persistent” and the provider has to ask: “Are your symptoms improving?” Most patients who are seeking treatment at this stage are not improving and would be diagnosed with ABRS.

Despite the strong support for utilizing clinical practice guidelines, guideline adherence may be eroded by clinicians' lack of familiarity with the guideline, inconsistent application, perception of interference with individualized care, or disagreement (File & Hadley, 2002; Gill et al., 2006). Typically, guidelines are vetted through rigorous systematic reviews, professional organizations and clinical experts. However, guidelines are guides -not rules- that are to be applied in conjunction with the clinician's experience and patient preference. One challenge of guideline dissemination is creating sufficient adherence so that deviations from the guideline recommendations are exceptions (Laximinarayan et al., 2013).

Laximinarayan et al., (2013) stated that physicians are influenced by their peers and perceived demands from patients. Providers can be influenced by colleagues and their prescribing trends. Patient perception and expectation for certain treatments can also influence how a physician will prescribe a certain medication. This peer and patient influence might be a barrier to treatment guidelines adoption. With the expansion of consumer-driven healthcare and more knowledgeable patients, many patients come to a provider with preconceived notions of diagnosis and needed treatment. More patients, who have investigated their potential diagnosis and treatment, have led many providers to prescribe unnecessary antibiotics for illnesses, due to busy office schedules and desire to avoid unpleasant conflict with patients.

Imprudent and hasty prescription of antibiotics for self-limited illnesses has led to the overgrowth of drug-resistant bacteria, such as methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile* (Hickner et al., 2001). Patients who are inappropriately treated with antibiotics have developed drug resistant bacteria, increased medical cost, increased time away from work, and increased time away from school (File & Hadley, 2002; Zoorob et al, 2012).

Utilizing clinical practice guidelines could help control the number of unnecessary antibiotic prescriptions written. As previously stated, utilization and adherence of treatment guidelines will lead to improved patient outcomes. Potential benefits of adherence to clinical guidelines could include decreased costs to the healthcare system and to patients, reduction in antibiotic resistant bacteria, and reduction in antibiotic overprescribing.

Rhinosinusitis is a common medical condition that affects approximately 1 in 8 adults in the United States accounting for over 30 million annual diagnoses (Rosenfeld et al., 2015). According to the authors, 20% of all antibiotics prescribed are for the treatment of sinusitis, which makes sinusitis the fifth most common diagnosis requiring antibiotic therapy. Research shows that despite the availability of national treatment guidelines for acute bacterial rhinosinusitis (ABRS) and acute viral rhinosinusitis (AVRS), antibiotics are still being overprescribed and continued variability in treatment practices still exist(Rosenfeld et al., 2015).

According to Rosenfeld (2015), national ambulatory data statistics between 2006-2010 revealed that rhinosinusitis accounted for more outpatient antibiotic prescriptions than any other diagnosis. The CDC specifies that a patient who presents with symptoms less than 7 days in duration is unlikely to have a bacterial infection. Supportive treatments, such as decongestants, antihistamines, and nasal washings could provide sufficient therapy for patients with these symptoms (Chow et al., 2012). Publications on rhinosinusitis first appeared in the 1970's. Many articles discuss the origin of sinusitis and appropriate treatments. An article written by Hamory, Sande, Sydnor, Seale, and Gwaltney (1979) discussed the origin and antimicrobial therapy for acute maxillary sinusitis. They studied 81 patients with symptoms of acute sinusitis, who underwent direct needle puncture and aspiration of the maxillary sinuses. *Streptococcus pneumoniae* and *Haemophilus influenza* accounted for 64% of the bacterial strains identified.

The World Health Organization (WHO) affirmed that the use of clinical practice guidelines is at the core of the managerial strategy in every health care system to improve diagnosis and therapy (WHO, 2001). The authors believe that in order for guidelines to be effective in a clinical practice they must be actively disseminated. Some strategies discussed to facilitate dissemination and adoption included local involvement of end-users in the development process, presentation of key elements in a simple algorithm or protocol, and dissemination in a multi-component program. The WHO's program would include innovative education and monitoring protocols that could impact adherence and reinforcement.

Alweis, Greco, Wasser, and Wenderoth (2014) examined enhancing the knowledge of providers and residents at a specific teaching facility. They implemented three small scale, bundled interventions: (1) guidelines sent to each provider by email; (2) CDC Get Smart posters placed in examination rooms; and (3) provider education on the CDC Get Smart: Know When Antibiotics Work prescription pads. The CDC's Get Smart Program: Know How Antibiotics Work was implemented into the practice not only to provide the patients with some foundational information in the waiting rooms and in the exam rooms, but also to offer clinicians knowledge and resources.

In previous bodies of work, researchers have not evaluated clinicians' treatment of AVRS and ABRS by examining the impact of a national education toolkit and a decision tree tool. It is the intent of this scholarly project to determine whether an educational program based on a national education toolkit plus a decision tree tool offered to health care providers in a Middle Tennessee walk-in clinic, promoted an increase in treatment guideline adherence when diagnosing and treating acute bacterial rhinosinusitis and acute viral rhinosinusitis.

Theoretical Framework

The Promoting Action on Research Implementation in Health Services framework (PARiHS) is a strategy for successfully implementing evidence into practice. It was initially published by Kitson and colleagues as an unnamed framework in 1998 focusing on practice improvement and guideline implementation efforts. The framework was refined and published in 2002. After additional evidence review, the developers created and published three central elements in 2004. Finally, in 2008, a two-step process was developed for PARiHS (Helfrich et al., 2010).

PARiHS is comprised of three main elements: evidence (E), which are sources of knowledge as perceived by multiple stakeholders; context (C), which is the quality of the environment where the research will be conducted; and facilitation (F), which are the techniques people utilize to support to change, i.e. attitudes, behaviors, skills, and/or thinking (Helfrich et al., 2010).

There are three or four sub-elements for each of the main elements that further explain and support each of the elements. Within the element ‘evidence’, the four sub-elements include research evidence from studies and clinical practice guidelines, formal experiments; clinical experience/professional knowledge; patient preferences and experiences; and project evaluation/quality improvement initiatives. For the element ‘context’, the sub-elements include receptive context/environment; organizational culture, leadership, and evaluation. Lastly, for the element ‘facilitation’, the sub-elements comprise purpose, role of the facilitator, and the skills/attributes of the facilitator (Helfrich et al., 2010).

Since its creation, the PARiHS framework has been utilized many times or cited in literature by many researchers. According to Ullrich, Sahay, and Stetler (2014), it has rich empirical support and strength for implementation projects that cannot be denied. However, because many of these researchers have not operationalized all of the key components of the framework, research is limited on how well this framework works in its entirety. One article demonstrated PARiHS' use in a quasi-experimental research design study. Sving, Hogman, Mamhidir, and Gunningberg (2014) examined knowledge and attitudes of nurses regarding pressure ulcer prevention in a hospital setting. The intervention was based on the PARiHS framework and included a multi-disciplinary team, training, and repeat quality measures.

The PARiHS framework was prospectively applied to this scholarly project because of its three main elements. The evidence included the clinical practice guidelines, CDC Get Smart program, and the adjusted decision tree tool that the project leader used as the foundation for provider education. The context of the project included support from organizational leadership, receptive environment to learning, and a known clinical environment to the project leader. The facilitation aspect contained the implementation of the project, Get Smart program materials, and the decision tree tool. Sving, Hogman, Mamhidir, & Gunningberg (2014) stated that successful implementation occurs when evidence was expansive, context/environment was receptive to change, and the process of change was facilitated appropriately.

Methods

Participants

The participants included eight health care providers (7 family nurse practitioners and 1 physician assistant) employed by a walk-in clinic in Middle Tennessee. The convenience sample included providers who rotated between three locations. Exclusion was determined if they were not an employee of the specified clinic.

Materials

Pre- and post- questionnaires were completed during the educational luncheon (See appendices A & B). The questionnaires were adapted from Alweis et al. (2014). The questionnaires remained anonymous and were reviewed for responses. The educational luncheon session was based on the Infectious Diseases Society of America (IDSA) treatment guideline on rhinosinusitis (Chow et al., 2012), information on the decision tree model the project leader created, discussion on most frequent codes used for diagnoses in the clinic, and the CDC's Get Smart program documents. The program documents consisted of handouts, pamphlets, patient teaching sheets, posters, viral prescription pads, and antibiotic teaching sheets. The information was presented in a PowerPoint format and allowed time for questions.

The CDC Get Smart program is a free educational program for providers and patients. The CDC's Get Smart program provides documents for laypersons and providers on how antibiotics work for particular well-known illnesses and helps to decrease overprescribing of antibiotics. The educational tools within the program allow for increased knowledge of common diseases seen in primary care linked to antibiotic over-prescription. The tools provide knowledge, not only on the diseases, but also recommended treatment regimens including non-antibiotic options.

These tools provide an excellent way to educate the public on the differences between viral and bacterial infections, but also when it is necessary to prescribe an antibiotic. Additional information about the Get Smart Program is available at: http://www.cdc.gov/getsmart/community/about/should-know.html. The decision tree tool was a modification of Chow et al. (2012) algorithm using patient symptoms and symptom timing to diagnosis and manages ABRS. The project leader adapted the published algorithm to incorporate a viral component to assist providers in diagnosing AVRS. (See Appendices C, D, E, F, G & I).

Design

The project was a quasi-experimental one-group, pre-post without randomization design. This design was chosen to answer questions regarding the pre- and post-treatment observed behavior of the participants. Three bundled small-scale interventions were implemented to determine the impact on treatment guideline adherence for acute bacterial and viral rhinosinusitis. The independent variables were the CDC's Get Smart Program, the educational luncheon curriculum, and the decision tree tool. The dependent variables in this project were provider knowledge and providers' treatment of AVRS and ABRS. Change in knowledge was measured through the pre- and post-education questionnaires. Providers' treatment of AVRS and ABRS was measured through chart reviews. Description of these items will be further discussed in the Procedure section.

Procedure

The 45-minute educational curriculum was provided at a luncheon to the providers in September 2015. Four clinicians were able to attend the initial session, plus administrative and nursing staff. The four participants completed consent and pre-test questionnaires. The questionnaire asked the providers questions regarding their personal experience and perceptions on treatment guidelines. The program curriculum included a discussion and review of the IDSA guideline on rhinosinusitis, education on utilizing the decision tree tool, and education on the CDC's Get Smart: Know When Antibiotics Work program.

The providers were shown all of the components of the Get Smart program (posters, handouts, brochures, fliers, teaching sheets, and viral prescription pad given to patients if diagnosed with AVRS). Following the completion of the educational curriculum, the providers completed a post-questionnaire to evaluate change in his/her knowledge and if they found the treatment guidelines and decision tree tool beneficial. The four participants who were not able to attend the group educational session received education on four different occasions because of schedule conflicts.

Using the electronic medical record (EMR) system (Touchworks), an IT associate compiled the charts by dates of visit, diagnoses, medical record numbers, providers participating in the educational sessions, and clinic location in a spreadsheet. This information allowed the project leader to analyze treatment patterns of the providers who had the opportunity to participate in the educational sessions.

Data collection occurred from October through December, 2015. Charts were viewed by medical record number (MRN). Once identified by the MRN, the project leader viewed the HPI for symptoms, diagnoses, and plan for treatment regimen. Symptoms identified included nasal congestion, sore throat, fever, cough, and/or nasal drainage. Timing of symptoms identified was grouped as: 1-2 days, 3-4 days, 5-10 days, and > 10 days. Diagnoses included ABRS or AVRS. ABRS was coded as sinusitis. AVRS was coded as viral syndrome or URI. Pediatric cases (age < 17) and diagnoses other than sinusitis, upper respiratory infection, and viral syndrome were excluded.

Antibiotic treatments included were Augmentin 875 mg, Augmentin 2000 mg, Doxycycline 100 mg, and/or Levofloxacin 500 mg. Supportive therapies that were identified included antihistamines, decongestants, nasal washings, and/or corticosteroid nasal sprays. Teaching modalities that were identified and included were CDC viral prescription pad, antibiotic teaching sheet, and/or follow-up recommendations. Each symptom, timing of symptom, diagnosis, prescriptive modality, supportive therapy, and teaching modality was coded as a dichotomous variable (yes/no), when identified in the chart.

Results

There were 8 providers who participated in the study; 7 were nurse practitioners and 1 was a physician assistant. At the educational luncheon 4 participants received the education; which included four providers (3 NP, 1 PA). Four other providers received their education at other times due to competing priorities (Table 1). A total of 114 charts were reviewed, with a retrospective chart review on 65 (57%) charts before the educational session and 49 (43%) charts reviewed after the educational session. The 114 charts reviewed included 56 ABRS diagnoses and 58 AVRS diagnoses (Table 2).

The project leader compared whether the training had any influence on the providers' ability to correctly diagnose ABRS and AVRS. The percentage of records with a likely diagnosis of ABRS or AVRS prior to implementation of the educational session was 49% ($n = 32$) for ABRS and 51% ($n = 33$) for AVRS. A Chi-square test was performed and this measure showed no statistical difference during the post-training phase of the study [$n = 24$(49%), 25(51%); ($p = 1.000$)] (Figure 1).

Nasal drainage and fever are primary symptoms that patients present when diagnosed with ABRS or AVRS. It is important to note that these symptoms present in ABRS during the 3-4 days of duration. If not diagnosed with ABRS, then it is presumed the illness is AVRS. Based on agreement with the Chow et al. (2012) guidelines, among patients who present to the clinic with symptoms within 1-2 days of duration, the providers diagnosed 2 cases of ABRS (6%). At 1-2 days of symptom duration, 94% of the cases were diagnosed as AVRS ($n = 31$). A Chi-square test was performed and there was a statistical significance and a relationship found between timing of symptoms and diagnoses ($p = 0.000$).

Providers diagnosed 22 cases of ABRS (59.5%) versus 15 cases of AVRS (40.5%) appropriately based on the guidelines, within 3-4 days of duration. A Chi-square test was performed, which resulted in a statistically significant relationship found between timing of symptoms and diagnoses ($p = 0.000$). In addition, providers diagnosed 17 cases of ABRS (61%) when compared to 11 cases of AVRS (39%), when patients presented with symptoms within 5-10 days duration. As previously noted, a Chi-square test was performed and there was a statistical significant relationship between timing of symptoms and diagnoses ($p = 0.000$). At the 3-4 and 5-10 day symptom range, when comparing the diagnoses of AVRS and ABRS; there was a fairly even split between the two diagnostic categories.

Lastly, patients who presented with symptoms to the clinic at > 10 days of duration were appropriately diagnosed with ABRS 94% of the time (15 of 16 cases). A Chi-square test was performed on the data. Among providers, there was a statistical significance in the relationship between timing of symptoms > 10 days of duration and significance ($p = 0.000$) (Figure 2). Of note, it was determined that providers did not ask and/or document the discriminating questions that would allow for the distinction of whether the provider was applying the guideline, when patients presented with symptom duration of 5-10 days and >10 days. Additionally, the project compared whether there was a change in how supportive therapies were recommended for AVRS after the educational session. The percentage of providers who documented supportive treatments prior to the implementation of the intervention was 29%. Participants' recommendation of supportive therapies after the educational session was unchanged based on a Chi-square test ($n = 19$; $p = .320$) (Figure 3).

Discussion

In this study, the providers appropriately diagnosed and treated patients with symptoms lasting 1-2 days and > 10 days consistently. No antibiotics were prescribed when patients were diagnosed with AVRS at 1-2 days of symptoms. However, if the patient was diagnosed with ABRS, antibiotic therapy was consistent with the guidelines When patients reported symptoms of 3-4 and 5-10 days in duration, charts showed variability in clinician diagnosis and treatment of AVRS and ABRS. Possible causes of the variability could be clinicians' experience with the guidelines, patients' symptoms and patients' presentation at time of visit.

Documentation of supportive therapies was inconsistent without differentiation for diagnosis or symptom duration. Of note, providers' knowledge of guideline adherence was not tested for change after implementation of program components, such as the decision tree tool and the CDC Get Smart Program. Due to a small convenience sample, the questionnaires' quantitative results from the clinicians were not utilized and a change in knowledge was undetermined before or after the educational session.

Qualitative data gathered through questionnaires suggested a positive response to both the decision tree tool and the CDC Get Smart program items distributed. Although the providers found the tool and program beneficial, there was no documented use of these items in the electronic medical record. A possible resolution would be to embed the tools in the electronic chart for ease of use, visualization, application, and documentation.

For symptoms ranging from 5-10 and > 10 days, a provider would need to ask a discriminating question, (such as "Did your symptoms improve and then get worse?" or "Are your symptoms improving?") and document this information, along with the patient's current symptoms in order for to comply with the guidelines. However, the discriminating question and documentation were missing from the reviewed charts both before and after the educational session. Because the information was absent from the chart, one would have to consider if the providers used the discriminating questions in their diagnostic reasoning. The conclusion might demonstrate a lack of guideline/decision tree utilization.

Additional research is needed to determine the cause of variability in treatment for those patients with symptoms lasting 3-4 and 5-10 days. Likewise, further education is warranted for providers to become more knowledgeable in the use of the guideline, which could result in the providers probing for additional information and documenting appropriately. Although the project leader believes that education is a valuable and necessary component for supporting positive practice change, the educational session and CDC materials were not sufficient to create change in this project. For those interested in promoting guidelines adherence, consideration of strategies in addition to an education session and the CDC materials may lead to improved likelihood of provider behavior change.

Conclusion

Guideline adherence of providers can vary, depending on knowledge of the present illness and practice styles. Most providers are guided by their clinical expertise and some other area of influence. The education session, the modified decision tool and the CDC Program materials showed no difference on the clinicians' practice behavior. Similarly, the study revealed variations in how clinicians are treating patients who seek treatment with 3-10 days of URI symptoms. Additional strategies, such as discussion or further research, are needed to assist providers in their ability to discriminate between these symptoms for improved diagnoses of ABRS and AVRS.

In this project, it was shown that education of the provider on guidelines did not show any statistical difference in their practice behavior. More research and discussion are needed in this specific subject to enhance the providers' knowledge on the appropriate tools and resources used to discriminate between viral and bacterial illness. Additional research is needed to identify other modes of education delivery that can lead to improved diagnoses of ABRS and AVRS. Ultimately, this improvement will lead to additional understanding that will aid in decreasing the improper use of antibiotics.

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Appendix A

Pre-Questionnaire for Providers on Guideline Adherence

1.) How many years has it been since you completed your original certification or most recent recertification?
   a. 0-5 years
   b. 6-10 years
   c. 11-15 years
   d. More than 15 years
2.) When was the last time you went to an educational conference of any type?
   a. 0-1 years
   b. 2-4 years
   c. 5-7 years
   d. 8 or more years
3.) When was the last time that you went to an educational conference that covered a topic dealing with allergies and/or sinusitis?
   a. 0-1 years
   b. 2-4 years
   c. 5-7 years
   d. 8 or more years
4.) For the diagnosis of acute bacterial rhinosinusitis, how well do you believe that you know the treatment guidelines?
   a. Not at all
   b. Mildly well

c. Moderately well

d. Very well

5.) For the diagnosis of acute bacterial rhinosinusitis, how often do you believe you prescribe antibiotics in a guideline adherent manner?

a. 0-25% of the time

b. 26-50% of the time

c. 51-75% of the time

d. 76-100% of the time

6.) For each of the following factors that might influence your decision to prescribe antibiotics, please indicate the importance of each factor:

a. Patient desires antibiotics

i. Not at all important

ii. Mildly important

iii. Moderately important

iv. Very important

b. Uncertainty in diagnosis

v. Not at all important

vi. Mildly important

vii. Moderately important

viii. Very important

c. Clinician lack of knowledge in treatment guidelines

ix. Not at all important

x. Mildly important

xi. Moderately important

xii. Very important

d. Lack of clinical decision support tools

xiii. Not at all important

xiv. Mildly important

xv. Moderately important

xvi. Very important

Appendix B

Post-Questionnaire for Providers on Guideline Adherence

7.) How many years has it been since you completed your original certification or most recent recertification?

  a. 0-5 years
  b. 6-10 years
  c. 11-15 years
  d. More than 15 years

8.) For the diagnosis of acute bacterial rhinosinusitis, how well do you believe that you know the treatment guidelines?

  a. Not at all
  b. Mildly well
  c. Moderately well
  d. Very well

9.) For the diagnosis of acute bacterial rhinosinusitis, how often do you believe you prescribe antibiotics in a guideline adherent manner?

  a. 0-25% of the time
  b. 26-50% of the time
  c. 51-75% of the time
  d. 76-100% of the time

10.) For each of the following factors that might influence your decision to prescribe antibiotics, please indicate the importance of each factor:

a. Patient desires antibiotics
    i. Not at all important
    ii. Mildly important
    iii. Moderately important
    iv. Very important
b. Uncertainty in diagnosis
    i. Not at all important
    ii. Mildly important
    iii. Moderately important
    iv. Very important
c. Clinician lack of knowledge in treatment guidelines
    i. Not at all important
    ii. Mildly important
    iii. Moderately important
    iv. Very important
d. Lack of clinical decision support tools
    i. Not at all important
    ii. Mildly important
    iii. Moderately important
    iv. Very important

11.) During this educational luncheon, did you learn any new information learned about national treatment guidelines for acute bacterial rhinosinusitis?

a. Yes

b. No

c. Somewhat

12.) Due to this information, will your prescribing habits change?

a. Definitely

b. Maybe

c. No

d. I don’t know

13.) Will you use the Decision Tree tool in your clinical practice?

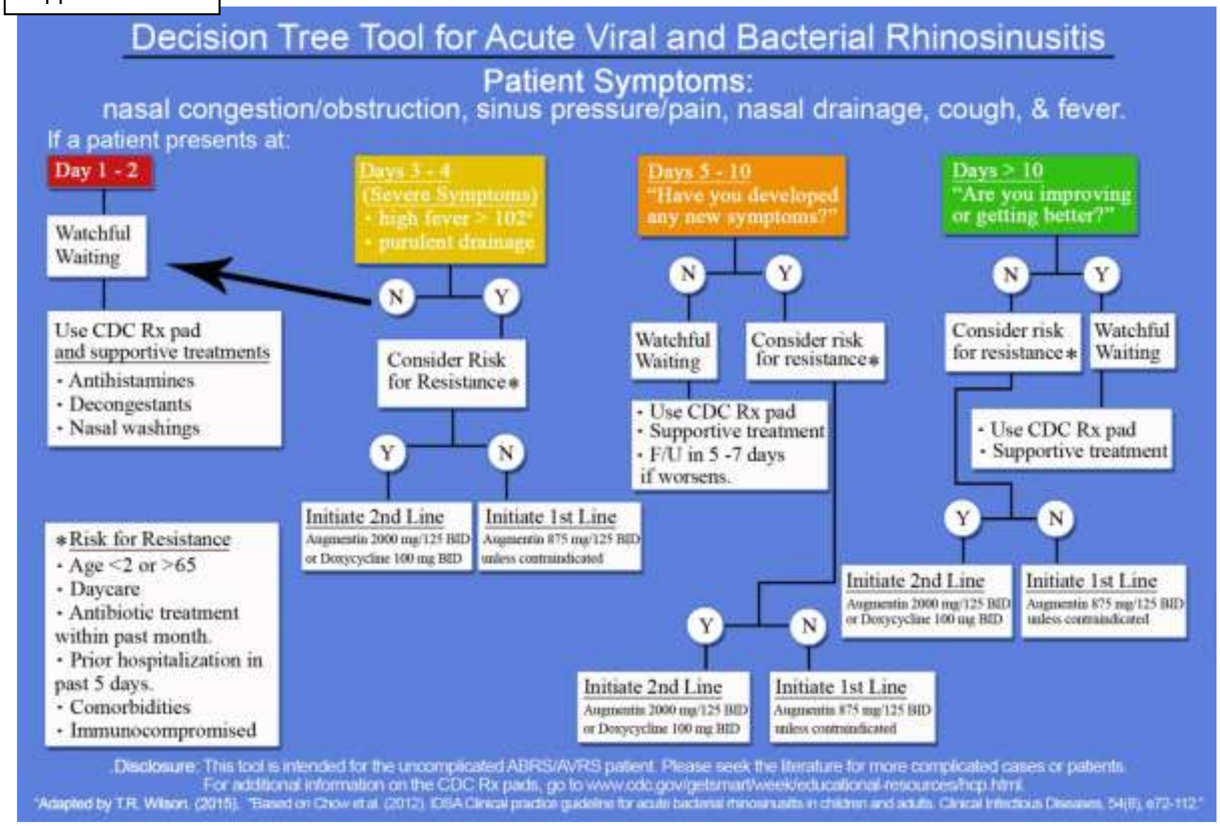
a. Definitely

b. Maybe

c. No

d. I don’t know

Appendix C


Decision Tree Tool for Acute Viral and Bacterial Rhinosinusitis
Patient Symptoms:
nasal congestion/obstruction, sinus pressure/pain, nasal drainage, cough, & fever.
If a patient presents at:
Day 1 - 2
Watchful Waiting
Use CDC Rx pad and supportive treatments
• Antihistamines
• Decongestants
• Nasal washings
Days 3 - 4
(Severe Symptoms)
• high fever > 102°
• purulent drainage
N
Y
Consider Risk for Resistance*
Y
N
Initiate 2nd Line
Augmentin 2000 mg/125 BID or Doxycycline 100 mg BID
Initiate 1st Line
Augmentin 875 mg/125 BID unless contraindicated
Days 5 - 10
"Have you developed any new symptoms?"
N
Y
Watchful Waiting
Consider risk for resistance*
• Use CDC Rx pad
• Supportive treatment
• F/U in 5 -7 days if worsens.
Y
N
Initiate 2nd Line
Augmentin 2000 mg/125 BID or Doxycycline 100 mg BID
Initiate 1st Line
Augmentin 875 mg/125 BID unless contraindicated
Days > 10
"Are you improving or getting better?"
N
Y
Consider risk for resistance*
Watchful Waiting
• Use CDC Rx pad
• Supportive treatment
Y
N
Initiate 2nd Line
Augmentin 2000 mg/125 BID or Doxycycline 100 mg BID
Initiate 1st Line
Augmentin 875 mg/125 BID unless contraindicated
*Risk for Resistance
• Age <2 or >65
• Daycare
• Antibiotic treatment within past month.
• Prior hospitalization in past 5 days.
• Comorbidities
• Immunocompromised
Disclosure: This tool is intended for the uncomplicated ABRS/AVRS patient. Please seek the literature for more complicated cases or patients.
For additional information on the CDC Rx pads, go to www.cdc.gov/getsmart/week/educational-resources/hcp.html
"Adapted by T.R. Wilson. (2015). "Based on Chow et al. (2012). IDSA Clinical practice guideline for acute bacterial rhinosinusitis in children and adults. Clinical Infectious Diseases, 54(8), e72-112."

Appendix D

Delivering safe care for patients: all healthcare providers play a role

Get Smart About Antibiotics Week
November 17-23, 2014

Did you know?

1. Antibiotic resistance is one of the world's most pressing public health threats.
2. Antibiotics are the most important tool we have to combat life-threatening bacterial diseases, but antibiotics can have side effects.
3. Antibiotic overuse increases the development of drug-resistant germs.
4. Patients, healthcare providers, hospital administrators, and policy makers must work together to employ effective strategies for improving antibiotic use – ultimately improving medical care and saving lives.

Scope of the Problem

Today, infections with antibiotic-resistant bacteria have become increasingly common in healthcare and community settings. In the U.S. each year, there are at least 2 million antibiotic-resistant infections, and at least 23,000 people die as a result each year. Antibiotic resistance occurs when germs change in a way that reduces or eliminates the effectiveness of the drugs available to treat them. Many bacteria have now become resistant to more than one type or class of antibiotic. Widespread overuse and inappropriate use of antibiotics is fueling resistance that compromises the effectiveness of important patient treatments. Overuse of antibiotics also increases the problems of drug side effects, allergic reactions, diarrheal infections caused by *Clostridium difficile*, or even death.

Antibiotic resistance is associated with:

- Increased risk of hospitalization
- Increased length of stay
- Increased hospital costs
- Increased risk of transfer to the intensive care unit
- Increased risk of death

Inpatient Settings

- Antibiotic resistance adversely impacts the health of millions of hospitalized patients every year.
- Of the patients receiving antibiotics, half (50%) will receive unnecessary or redundant therapy, resulting in overuse of antibiotics.
- Unnecessary use of antibiotics creates risk of adverse drug events and *Clostridium difficile*, a deadly diarrheal infection that is on the rise.
- Some infections in hospitals are now resistant to all available antibiotics.

Outpatient Settings

- Each year, tens of millions of antibiotics are prescribed unnecessarily for viral upper respiratory infections.
- In states where there is more antibiotic use, there are more antibiotic-resistant pneumococcal infections.
- Antibiotic use in primary care is associated with antibiotic resistance at the individual patient level.
- The presence of antibiotic-resistant bacteria is greatest during the month following a patient's antibiotic use and may persist for up to 12 months.

Centers for Disease Control and Prevention
Get Smart Programs

Appendix E

Rx

Name: ___________________________

Date: ______/______/______

GET SMART
Know When Antibiotics Work

Diagnosis:

- ◯ Cold
- ◯ Cough
- ◯ Flu
- ◯ Middle ear fluid (Otitis Media with Effusion, OME)
- ◯ Viral sore throat
- ◯ Other: ___________________________

You have been diagnosed with an illness caused by a virus. **Antibiotics do not cure viral infections.** If given when not needed, antibiotics can be harmful. The treatments prescribed below will help you feel better while your body's own defenses are fighting the virus.

General instructions:

- ◯ Drink extra water and juice.
- ◯ Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- ◯ For sore throats, use ice chips or sore throat spray; lozenges for older children and adults.

Specific medicines:

- ◯ Fever or aches:
- ◯ Ear pain:
- ◯ ___________________________
- ◯ ___________________________

Use medicines according to the package instructions or as directed by your healthcare provider. Stop the medication when the symptoms get better.

Follow up:

- ◯ If not improved in _____ days, if new symptoms occur, or if you have other concerns, please call or return to the office for a recheck.

- ◯ Other: ___________________________
____

Signed: ___________________________

For More Information call 1-800-CDC-INFO
or visit www.cdc.gov/getsmart

Appendix F

Viruses or Bacteria
What's got you sick?

Antibiotics only treat bacterial infections. Viral illnesses cannot be treated with antibiotics. When an antibiotic is not prescribed, ask your healthcare professional for tips on how to relieve symptoms and feel better.

Illness	Usual Cause		Antibiotic Needed
	Viruses	Bacteria	
Cold/Runny Nose	✓		NO
Bronchitis/Chest Cold (in otherwise healthy children and adults)	✓		NO
Whooping Cough		✓	Yes
Flu	✓		NO
Strep Throat		✓	Yes
Sore Throat (except strep)	✓		NO
Fluid in the Middle Ear (otitis media with effusion)	✓		NO
Urinary Tract Infection		✓	Yes

Antibiotics Aren't Always the Answer

www.cdc.gov/getsmart

GET SMART

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Sept 2014

Appendix G

When you feel sick, you want to feel better fast. But antibiotics aren't the answer for every illness. This brochure can help you know when antibiotics work – and when they won't. For more information, talk to your healthcare provider or visit www.cdc.gov/getsmart.

The Risk: Bacteria Become Resistant

What's the harm in taking antibiotics anytime? Using antibiotics when they are not needed causes some bacteria to become resistant to the antibiotic.

These resistant bacteria are stronger and harder to kill. They can stay in your body and can cause severe illnesses that cannot be cured with antibiotics. A cure for resistant bacteria may require stronger treatment – and possibly a stay in the hospital.

To avoid the threat of antibiotic-resistant infections, the Centers for Disease Control and Prevention (CDC) recommends that you avoid taking unnecessary antibiotics.

Antibiotics Aren't Always the Answer

Most illnesses are caused by two kinds of germs: bacteria or viruses. Antibiotics can cure bacterial infections – not viral infections.

Bacteria cause strep throat, some pneumonia and sinus infections. *Antibiotics can work.*

Viruses cause the common cold, most coughs and the flu. *Antibiotics don't work.*

Using antibiotics for a virus:

- Will NOT cure the infection
- Will NOT help you feel better
- Will NOT keep others from catching your illness

Protect Yourself With the Best Care

You should not use antibiotics to treat the common cold or the flu.

If antibiotics are prescribed for you to treat a bacterial infection – such as strep throat – be sure to take all of the medicine. Only using part of the prescription means that only part of the infection has been treated. Not finishing the medicine can cause resistant bacteria to develop.

Talk to Your Healthcare Provider to Learn More

Commonly Asked Questions:

How Do I Know if I Have a Viral or Bacterial Infection?

Ask your healthcare provider and follow his or her advice on what to do about your illness.

Remember, colds are caused by viruses and should not be treated with antibiotics.

Won't an Antibiotic Help Me Feel Better Quicker so That I Can Get Back to Work When I Get a Cold or the Flu?

No, antibiotics do nothing to help a viral illness. They will not help you feel better sooner. Ask your healthcare provider what other treatments are available to treat your symptoms.

If Mucus from the Nose Changes from Clear to Yellow or Green — Does This Mean I Need an Antibiotic?

No. Yellow or green mucus does not mean that you have a bacterial infection. It is normal for mucus to get thick and change color during a viral cold.

Appendix H

Antibiotic stewardship – the ultimate return on investment

Get Smart About Antibiotics Week
November 17-23, 2014

Did you know?

1. Antibiotic resistance is one of the world's most pressing public health threats.
2. Antibiotics are the most important tool we have to combat life-threatening bacterial diseases, but antibiotics can have side effects.
3. Antibiotic overuse increases the development of drug-resistant germs.
4. Patients, healthcare providers, hospital administrators, and policy makers must work together to employ effective strategies for improving antibiotic use – ultimately improving medical care and saving lives.

Save money with antibiotic stewardship

Antibiotic stewardship programs and interventions help ensure that patients get the right antibiotics at the right time for the right duration. Numerous studies have shown that implementing an antibiotic stewardship program can not only save lives, but can save significant healthcare dollars. Inpatient antibiotic stewardship programs have consistently demonstrated annual savings to hospitals and other healthcare facilities of $200,000 to $400,000.

- According to a University of Maryland study, implementation of one antibiotic stewardship program saved a total of $17 million over 8 years at one institution.
  - After the program was discontinued, antibiotic costs increased over $1 million in the first year (an increase of 23 percent) and continued to increase the following year.
- In a study conducted at The Johns Hopkins Hospital, it was demonstrated that guidelines for management of community-acquired pneumonia could promote the use of shorter courses of therapy, saving money and promoting patient safety.
- Targeting certain infections may decrease antibiotic use. For example, determining when and how to treat patients for urinary tract infections, the second most common bacterial infection leading to hospitalization, can lead to improved patient outcomes and cost savings.

Antibiotic stewardship programs are a "win-win" for all involved.

- A University of Maryland study showed one antibiotic stewardship program saved a total of $17 million over 8 years.

- Antibiotic stewardship helps improve patient care and shorten hospital stays, thus benefiting patients as well as hospitals.

Centers for Disease Control and Prevention
Get Smart Programs

CDC

Table 1.

Demographics: Providers

Nurse Practitioners	Physician Assistants
7	1

Table 2.

Demographics: Total Charts Before/After Training

Before Educational Session	After Educational Session
65 (57%)	49 (43%)

Table 3.

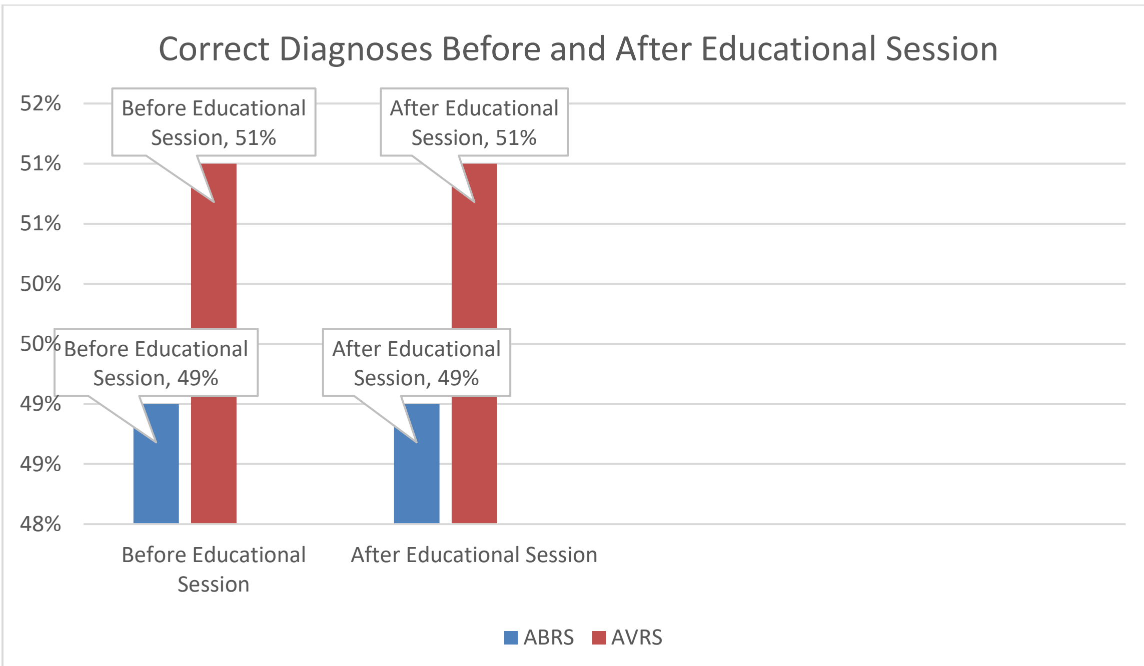
Likely Diagnosis cases Before/After Training

	Before Training	After Training
ABRS (n = 56)	57.1% (n=32)	42.9% (n=24)
AVRS (n = 58)	56.9% (n=33)	43.1% (n=25)

(n = 114; p = 1.000)

Figure 1.

Likely Diagnoses Before and After Educational Session



ABRS (n = 32, 24)
AVRS (n = 33, 25)
($p = 1.000$)

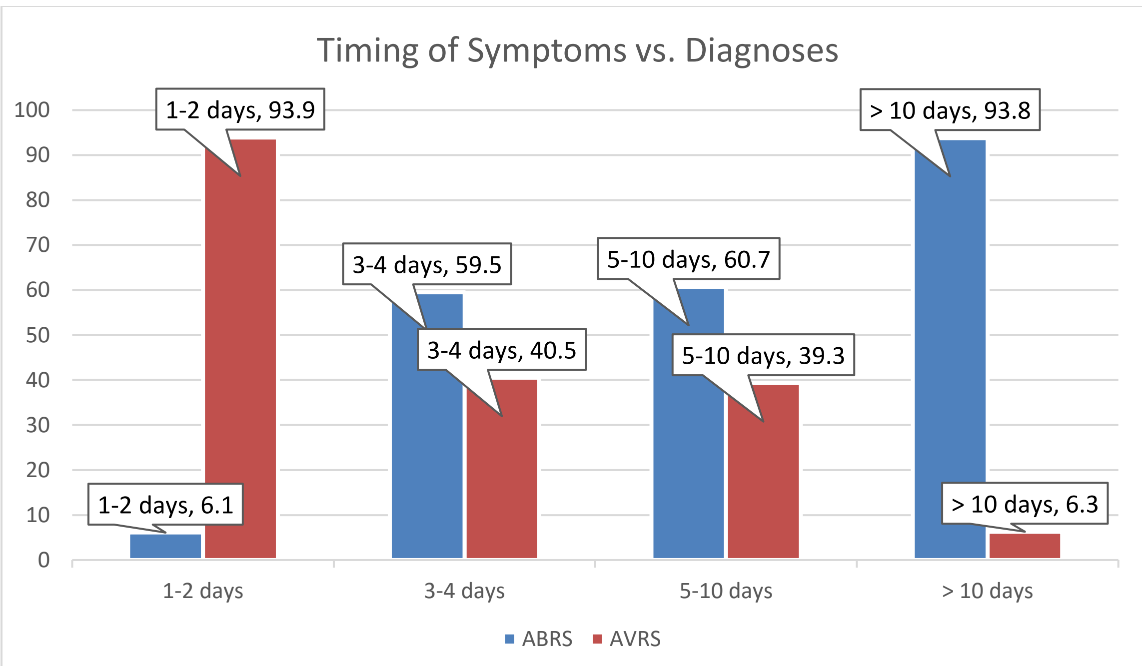
Table 4.

# of cases: Timing of Symptoms and Diagnoses of AVRS and ABRS

	1-2 days	**3-4 days**	**5-10 days**	**➢ 10 days**
ABRS	2	22	17	15
AVRS	31	15	11	1

Figure 2.

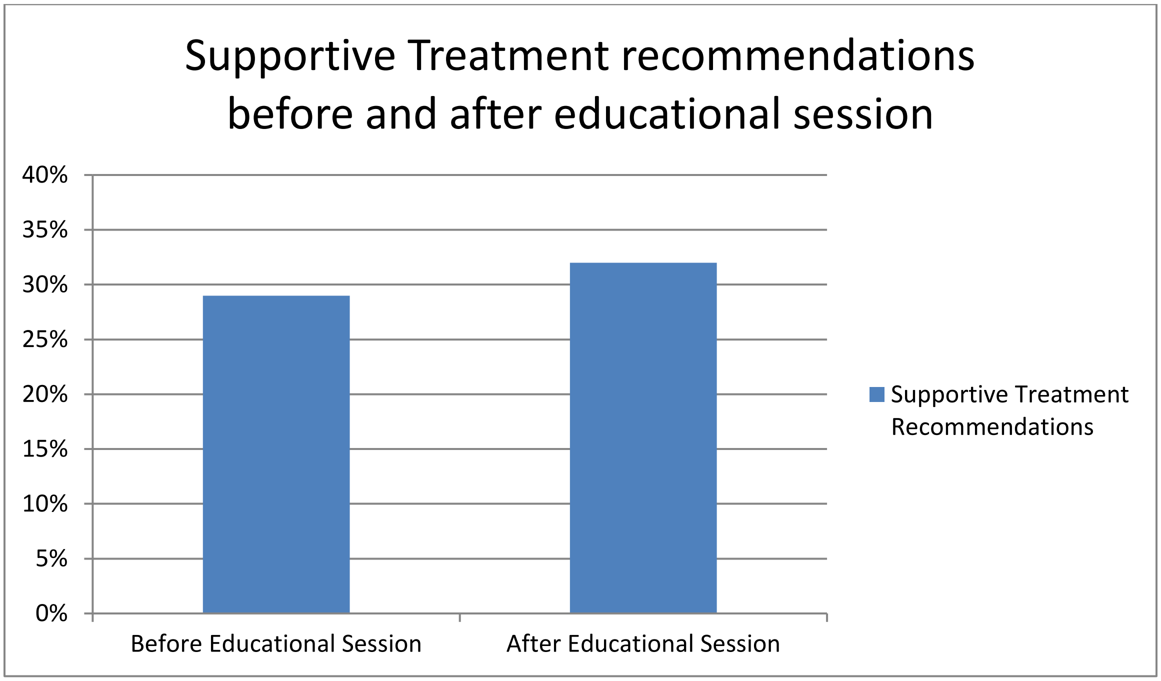
Timing of symptoms and diagnosis of ABRS and AVRS



(n = 114; p = 0.000)

Figure 3.

Supportive treatment recommendations before and after educational session



(n = 19, 19; p = .320)